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Twice-Reclaimed Asphalt Pavement (RAP²)

What happens when an existing pavement section constructed with reclaimed asphalt pavement (RAP) over 20 years ago is recycled again? Researchers from the NHDOT, the University of New Hampshire, the Federal Highway Administration, and Industry are now finding out.



The FHWA Mobile Asphalt Lab will spend much of the summer at Pike Industries Northfield plant, a sign of the national attention being generated by the research project.

In the late 1980's, a section of I93 in Woodstock, NH was constructed using 35% RAP. Such high percentages of RAP were unheard of in New Hampshire at the time, particularly in surface mixes. Ongoing pavement rehabilitation work along this same section of Interstate is now providing a unique opportunity for researchers to 1) evaluate the long-term performance of the existing recycled pavement section and 2) evaluate new test sections using materials recycled again to reach up to 40% total RAP.

In Phase I, cores were obtained from the existing northbound lanes and compared with two other pavements of comparable age constructed with virgin asphalt. The existing NB pavement was milled in 2010 and stockpiled for later use. This material was blended with virgin materials in June 2011 to create six 1-mile test sections on the southbound side using

(Continued on page 4)

Research Leads to New Wildlife Management Approach at Pease Airport

With its large open grasslands, the Portsmouth International Airport at Pease (PSM) is the only known nesting ground in New Hampshire for the state-endangered Upland Sandpiper. PSM, the NH Fish & Game Department, and the New Hampshire Audubon have been working cooperatively to monitor and protect the birds at the airport since 1990.

PSM is required to comply with Federal Aviation Administration (FAA) regulations pertaining to aviation hazards related to wildlife. While breeding sandpipers themselves are not a serious safety hazard, their critical habitat can attract other more dangerous bird and mammal species. A 2006 FAA "Ceralert" highlighted the need for PSM to review the existing management agreement.

In 2009, an NHDOT-sponsored research project was begun to study the characteristics of the upland sandpiper nesting habitat, assess the breeding population of sandpipers in the NH seacoast region, evaluate potential alternative habitat in close proximity to PSM, and design a coordinated plan to encourage use of other breeding sites.

Unfortunately the research concluded that relocation of the sandpipers to alternative breeding sites was not practical. However, the project resulted in a renewed commitment to address the conflicting interests of airport operators and wildlife biologists through implementation of modified mowing and observation activities that should reduce the impact on wildlife without compromising safety at the airport.



Upland Sandpiper

Implementation Corner

Warm Mix Asphalt (WMA) now a Standard In New Hampshire

Warm Mix Asphalt (WMA) originated in Europe in the 1990's in response to a variety of environmental and safety concerns. WMA technologies allow mixing and compaction temperatures to be reduced 35-100° F below those of traditional hot mix asphalt. The lower temperatures reduce emissions, energy costs, and aging of the binder and can allow for longer haul distances, cool weather paving, and better compaction of mixtures with high RAP content.

Over the past decade, interest and research in WMA technologies has grown in the United States. Research conducted by the University of New Hampshire in 2005-2009 focused on the moisture susceptibility and low temperature cracking of mixes using specific WMA additives. By 2010, WMA was being substituted for hot mix asphalt on NHDOT projects, leading to development of standard specifications and qualification of selected WMA technologies.

In the spring of 2011, the Department implemented a standard specification for WMA, along with a list of qualified technologies that currently include eight foamers, organic waxes, and chemical additives.



Performance of Backing Cameras on NHDOT Maintenance Vehicles

The National Safety Council estimates that 25% of all accidents involve backing and that there are about 500 fatalities per year due to these accidents. The NHDOT operates many vehicles with limited rearward visibility including dump trucks, loaders, and graders.



From 2006 through 2008, the NHDOT had 117 accidents involving backing vehicles costing approximately \$138,000 in damages to state and private property.

In 2008, a Research project was initiated to investigate the benefits of using backing cameras to improve safety in the NHDOT fleet. Two manufacturers, Safety Vision and Intec, supplied a total of seven backing camera systems for evaluation. This allowed for the installation of a

system on one vehicle in each of its six Maintenance Districts and on one vehicle in the Turnpikes Bureau. The vehicles were chosen based on their designated routes which required backing either over long distances or multiple times, such as at intersections. After a full year of operation, drivers of the vehicles were interviewed to obtain their assessments and opinions regarding the cameras.

The following conclusions and recommendations resulted from the project:

- Cameras are especially useful for operations that involve trailers.
- Overhead-mounted monitors should have glare shields, adjustable brightness, and contrast settings.
- Automatic shutter (lens cover) on the camera is necessary.
- Cameras should be mounted on the spreader for winter operations or on an unobstructed area on the truck.
- A receiver-type, quick mounting system is a plus.
- Supply adequate wire length to avoid unplugging the camera when moving from truck to spreader.
- Trucks with municipal bodies should have cameras on the truck for summer operations that can be moved to the tailgate for winter operations.
- Cameras would be particularly beneficial on loaders and graders.



Monitor Indicating Range Marks

Completed Research

Evaluation of Poly-Carb Flexogrid Bridge Deck Overlay System



Application of Epoxy and Aggregate in Hampton

River. A conventional pavement and membrane systems would have added at least two inches to the bridge deck and was not feasible, since the added depth would not match the grade of the bascule span and expansion joints.

The system was also applied to the metal decking of a temporary bridge over the Connecticut River in Lebanon. Heavy truck traffic caused the original pavement installed on the metal decking to shove and delaminate in several areas. Poly-Carb Flexogrid was selected as an experimental friction-providing wearing surface for this bridge. Lab tests showed that the best adhesion to the steel deck plate would be attained by removing the galvanizing and shot-blasting the deck plate to bare steel. In June 2010, the deck plate on the bridge was prepared and the Flexogrid system applied.

Inspection and monitoring of both installations will take place over the next few years to evaluate the longer-term performance of the Flexogrid system.



Temporary Bridge in Lebanon

Poly-Carb Mark 163 Flexogrid Bridge Deck Overlay System is a two-part liquid system that is mixed on the jobsite. The system provides waterproofing and acts as an anti-skid surface on bridge decks, with minimal added thickness. Treatment commences with the application of a liquid pre-treatment that penetrates and seals existing cracks in the deck. A coat of epoxy is applied over the pre-treatment and aggregate is broadcast into the epoxy. Then a final epoxy and aggregate coat is applied.

The system was applied in 2010 to the stationary spans of a concrete bridge deck in Hampton, on NH Route 1A over the Hampton

Experimental Features

NHDOT Participating with TRB in “Electronic First, Paper on Request” Pilot Program for Distribution of Publications

A survey conducted in 2010 by the Transportation Research Board (TRB) showed that a majority of TRB sponsors (state DOTs) are interested in reducing the volume of TRB publications received by mail. Such publications include NCHRP reports, NCHRP Syntheses, and the Transportation Research Record (TRR) Series.

New Hampshire and a handful of other states are now working with TRB to “beta test” an alternative delivery system. A number of options are available, including more widespread marketing and use of the TRB e-Newsletter. The e-Newsletter enables any employee to subscribe to user-selected topical categories and receive information only related to that topic on a weekly basis. Information includes recent publications which can be viewed online in full-text, or requested in hard copy free of charge. By only requesting publications that are of particular interest to the user, transportation professionals are able to reduce the magnitude of paper being processed and frequently introduced into the waste stream.

Some states are also experimenting with RSS (really simple syndication) feeds, which allow content to be posted on websites (including Intranet sites) or delivered to individuals through readers called “aggregators”. RSS options deliver information in real time, but require users to visit a specific site to notice updates or, in the case of individual notification, could lead to additional information overload.

To participate in this pilot, please contact the Research office.

*“The best way
to predict the
future is to
invent it.”*

- Alan Kay

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RAP² (cont'd from Page 1)

two different PG asphalt cements and RAP contents as summarized in the table below.

Initial results of the placement are very positive. Compaction was very good in all mixes, using the same compactive effort and rolling pattern, with the lowest compaction occurring in the virgin control section. There were no reported issues at the plant.

UNH is coordinating the mixture and binder testing of various mixes with assistance from the NHDOT, FHWA Mobile Asphalt Lab, UMass-Dartmouth, Rutgers University, and Pike Industries.

NEW I93 Southbound TEST SECTIONS	
Control 1: Virgin Mix w/ PG 58-28 asphalt	Control 2: 15% RAP from project millings w/ PG 58-28
Contractor RAP (unknown source): 25% w/PG 58-28	Contractor RAP (unknown source): 25% w/PG 52-34
30% RAP from project millings w/ PG 52-34	40% RAP from project millings w/ PG 52-34

Wood Preservative Synthesis Prepared for NHDOT

Historically the NHDOT has used treated wood timber products in the construction and repair of railroad trestles. Recently, negative impacts have been observed within environmentally sensitive areas; for example, repairs to the Frankenstein Trestle in Crawford Notch in 2008 included the installation of timbers that continued to release creosote more than a year after initial construction. As a result, the Department has temporarily suspended the use of treated wood timbers pending results from a synthesis study commissioned in January 2011.

The goals of the synthesis effort are to provide 1) an assessment of the various wood preservatives and available treatment/curing techniques in current use, 2) the advantages/disadvantages of each product/technique, 3) guidelines on the recommended use/non-use of various alternatives, and 4) best practices or engineering controls to limit future environmental impacts. The study will also include identification of any alternative non-wood products currently in use for similar applications.

It is recognized that there is a wealth of information currently available on the subject. As such, the scope of the project is intended to capture existing industry and agency practice and does not include testing, field analyses, development of new techniques, or new engineering controls or designs. The project deliverables include a matrix that incorporates the following minimum information:

- Cost
- Environmental considerations and limitations
- Longevity
- Safety considerations (worker health, fire susceptibility, special licenses/permits for field application)
- Disposal of waste wood products
- Availability

A second draft report was received from the consultant in June 2011. Following acceptance of the final report, the project Technical Advisory Group will prepare a series of recommendations and specifications for future use of wood preservatives in New Hampshire. The project is expected to be completed by summer.



Tarp Installed below the Frankenstein Trestle in Crawford Notch to Protect Hiking Trail from Dripping Creosote

WHAT'S YOUR PROBLEM?